<u>AMENDMENTS TO THE SPECIFICATION</u>

<u>Please amend the paragraph [0001] of the specification as indicated:</u>

[0001]   The present invention relates to a data processing method for hybrid automatic

request for repeat (hereinafter, referred to as an ARQ) type II/III on a downlink of a wide-band

radio communication system; and, more particularly, to a method for processing a radio link

control–protocol data unit (RLC-PDU) and a HARQ-RLC-Control-PDU, which is extracted

from the RLC-PDU, by using a transport channel such as a downlink shared channel (DSCH),

wherein the RLC-PDU is used in W-CDMA based on a next generation mobile communication

network, such as an international mobile telecommunication (IMT)–2000 and a universal mobile

telecommunications system (UMTS), and to a computer readable recording media having

program instructions for carrying out the method.

[Note to the Examiner: added a "." at the end of the paragraph.]

<u>Please amend the paragraph [0018] of the specification as indicated:</u>

[0018]   When transporting the data from a radio network of a UMTS terrestrial radio

access network (UTRAN) to the mobile station (MS), a Hybrid ARQ type <u>II/III</u> [[I/II]] which has

superior throughput than a Hybrid ARQ type I may be used.

<u>Please amend the paragraph [0023] of the specification as indicated:</u>

[0023]   FIG. 3 is a diagram showing a general UTRAN. In FIG. 3, the Iu is an interface

between the radio communication core network 300 and the asynchronous radio <u>networks</u>

~~network~~ 200, [[and,]] the Iur <u>is an</u> ~~means a logical~~ interface between radio network controllers

(RNC) of the asynchronous radio networks 200<u>,</u> and the Iub <u>is</u> [[shows]] an interface between

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each [[the]] RNC and <u>one or more of the Nodes B</u> ~~each Node B~~. Uu<u>, while not shown in FIG. 3,</u>

<u>generally</u> designates a radio interface between the UTRAN and the UE.

[Note to the Examiner: With respect to the Examiner's objection to paragraph [0023] that the labels Iu, Iur, and Iub are inconsistent with the labels in Figure 3, Applicant submits that these labels are not inconsistent. Rather, the differing appearance of the labels in the discussion of Figure 3 and in Figure 3 itself is a product of typeface. The labels in Figure 3 are printed in an Arial typeface, making each capital I appear similar to a lowercase L.]

Please amend paragraph [0024] of the specification as indicated:

[0024]   Node B is a logical node, ~~which is~~ responsible for [[a]] radio <u>transmission and</u>

<u>receiving</u> ~~transmission/receiving~~ from one or more cells to the UE.

Please amend the paragraph [0036] of the specification as indicated:

[0036]   However, for the hybrid ARQ type II/III in the UTRAN, the data is transmitted

with <u>a</u> [[the]] high coding rate, thereby increasing the possibility of an error <u>in</u> [[of]] a header of

<u>an</u> [[a]] RLC-PDU ~~is increasing~~.   Therefore, a method of stably transmitting the RLC-PDU

header is required.

Please amend the paragraph [0038] of the specification as indicated:

~~[0038]   In accordance with an aspect of the present invention, there is provided a data~~

~~processing method for a hybrid ARQ type II/III on a downlink of a wide-band radio~~

~~communication system, wherein a serving radio network controller (hereinafter, referred to as a~~

~~SRNC) which is directly connected to a user equipment to allocate wireless resources to the user~~

~~equipment and provides services by interlocking with a wireless communication core network in~~

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case of a call connection and a controlling radio network controller (hereinafter, referred to as a CRNC) which controls a shared channel of a radio network, are located on different radio networks, comprising the steps of: a) generating a radio link control protocol data unit (hereinafter, referred to as a RLC PDU) in a radio link control (hereinafter, referred to as a RLC) layer of the SRNC, and generating a part having RLC PDU information needed for supporting the hybrid ARQ type II/III based on a header of the RLC PDU (hereinafter, referred to as a HARQ RLC Control PDU); b) transmitting the RLC PDU and the HARQ RLC Control PDU to a medium access control dedicated (hereinafter, referred to as a MAC D), which treats a general user part of a MAC layer through a logical channel; c) transmitting the RLC PDU and the HARQ RLC Control PDU from the MAC D of the SRNC to a medium access control common/shared (hereinafter, referred to as a MAC C/SH), which treats common/shared channel part on the MAC layer of the CRNC; d) transforming the RLC PDU and the HARQ RLC Control PDU in the MAC C/SH of the CRNC to a transmission block and transmitting it to a physical layer of a base station through a transport channel; and e) processing the transmission block to a radio transmission form in the physical layer of the base station and transmitting it from the base station through the physical layer.

[0038]   In accordance with an aspect of the present invention, there is provided a data processing method for a hybrid ARQ (HARQ) type II/III on a downlink of a wide-band radio communication system, wherein (i) a serving radio network controller (SRNC), which is directly connected to a mobile station to allocate wireless resources to the mobile station and provides services by interlocking with a wireless communication core network in case of a call connection, and (ii) a controlling radio network controller (CRNC), which controls a sharing channel of a radio network on which the CRNC is located, are located on different radio

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networks, the method comprising the steps of: a) generating a radio link control (RLC) – protocol data unit (PDU) (RLC-PDU) in an RLC layer of the SRNC and generating a PDU having RLC-PDU information needed for supporting the hybrid ARQ type II/III based on a header of the RLC-PDU (HARQ-RLC-Control-PDU); b) transmitting the RLC-PDU and the HARQ-RLC-Control-PDU via a logical channel to a medium access control dedicated entity (MAC-D) which treats a protocol data unit transmitted from the RLC layer of the SRNC to a MAC layer of the SRNC via a first logical channel; c) transmitting the RLC-PDU and the HARQ-RLC-Control-PDU from the MAC-D of the SRNC to a medium access control common/shared entity (MAC-C/SH), a common/shared part of a MAC layer of the CRNC; d) transforming the RLC-PDU and the HARQ-RLC-Control-PDU to a transmission block and transmitting the transmission block to a physical layer of a base station through a first transport channel; and e) processing the transmission block to a radio frame in the physical layer of the base station and transmitting the radio frame to the mobile station through a physical channel.

Please amend the paragraph [0039] of the specification as indicated:

[0039]   Also, the present invention may further comprising the step of: f) storing the RLC-PDU to a buffer, extracting the RLC-PDU stored in the buffer by using the HARQ-RLC-Control-PDU, decoding the extracted RLC-PDU and transmitting the RLC-PDU to an upper layer, then transmitting a response to the radio network on which the SRNC is located.

Please amend the paragraph [0040] of the specification as indicated:

[0040]   In accordance with another aspect of the present invention, there is provided a computer readable data recording media for a hybrid ARQ type II/III on a downlink of a wide-

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band radio communication system, wherein a serving radio network controller (hereinafter, referred to as a SRNC) which is directly connected to a user equipment to allocate wireless resources to the user equipment and provides services by interlocking with a wireless communication core network in case of a call connection and a controlling radio network controller (hereinafter, referred to as a CRNC) which controls a shared channel of a radio network are located on different radio networks, comprising the functions of: a) generating a radio link control protocol data unit (hereinafter, referred to as a RLC PDU) in a radio link control (hereinafter, referred to as a RLC) layer of the SRNC, and generating a protocol data unit having RLC PDU information needed for supporting the hybrid ARQ type II/III based on a header of the RLC-PDU (hereinafter, referred to as a HARQ-RLC-Control-PDU); b) transmitting the RLC-PDU and the HARQ-RLC-Control-PDU to a medium access control dedicated (hereinafter, referred to as a MAC-D), which treats a general user part of a MAC layer through a logical channel; c) transmitting the RLC-PDU and the HARQ-RLC-Control-PDU from the MAC-D of the SRNC to a medium access control common/shared (hereinafter, referred to as a MAC-C/SH), which treats common/shared channel part on the MAC layer of the CRNC; d) transforming the RLC-PDU and the HARQ-RLC-Control-PDU of the MAC-C/SH of the CRNC to a transmission block and transmitting it to a physical layer of a base station through a transport channel; and e) processing the transmission block to a radio transmission form in the physical layer of the base station and transmitting it from the base station through the physical layer.

[0040]   In accordance with another aspect of the present invention, there is provided a computer readable data recording media having instructions for a data processing method for a hybrid ARQ (HARQ) type II/III on a downlink of a wide-band radio communication system, wherein (i) a serving radio network controller (SRNC), which is directly connected to a mobile

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station to allocate wireless resources to the mobile station and provides services by interlocking with a wireless communication core network in case of a call connection and (ii) a controlling radio network controller (CRNC), which controls a sharing channel of a radio network on which the CRNC is located, are located on different radio networks, the method comprising the functions of: a) generating a radio link control (RLC) – protocol data unit (PDU) (RLC-PDU) in an RLC layer of the SRNC and generating a PDU having RLC-PDU information needed for supporting the hybrid ARQ type II/III based on a header of the RLC-PDU (HARQ-RLC-Control-PDU); b) transmitting the RLC-PDU and the HARQ-RLC-Control-PDU via a logical channel to a medium access control dedicated entity (MAC-D) which treats a protocol data unit transmitted from the RLC layer of the SRNC to a MAC layer of the SRNC via a first logical channel; c) transmitting the RLC-PDU and the HARQ-RLC-Control-PDU from the MAC-D of the SRNC to a medium access control common/shared entity (MAC-C/SH), a common/shared part of a MAC layer of the CRNC; d) transforming the RLC-PDU and the HARQ-RLC-Control-PDU to a transmission block and transmitting the transmission block to a physical layer of a base station through a first transport channel; and e) processing the transmission block to a radio frame in the physical layer of the base station and transmitting the radio frame to the mobile station through a physical channel.

Please amend the paragraph [0041] of the specification as indicated:

[0041]   Also, the present invention further comprising the function of: f) storing the RLC-PDU to a buffer, extracting the RLC-PDU stored in the buffer by using the HARQ-RLC-Control-PDU, decoding the extracted RLC-PDU and transmitting the RLC-PDU to an upper layer, then transmitting a response on the radio network on which the SRNC is located.

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Please amend the paragraph [0046] of the specification as indicated:

[0046]   The RLC-PDU and the HARQ-RLC-Control-PDU are transmitted from a RLC protocol entity to a MAC-D protocol entity by using one or more logical channels and transmitted from the MAC protocol entity to the physical layer by using one or two transport channels ~~channel~~ of same type. Also, the [[The]] RLC-PDU and the HARQ-RLC-Control-PDU are transmitted from a transmitting part to a receiver by using one or two physical channels of the same type.

Please amend the paragraph [0053] of the specification as indicated:

[0053]   FIG. 5A is a diagram showing a UTRAN when an RNC has both [[of]] SRNC and CRNC function in accordance with the present invention;

Please amend the paragraph [0054] of the specification as indicated:

[0054]   FIG. 5B is a diagram showing a UTRAN when one RNC has CRNC function and another [[other]] RNC has SRNC function in accordance with the present invention;

Please amend the paragraph [0056] of the specification as indicated:

[0056]   FIG. 7 is a diagram showing a data processing ~~process~~ method of a transmitting part in accordance with the present invention;

Please amend the paragraph [0061] of the specification as indicated:

[0061]   Referring to FIGS. 5A and 5B ~~FIG. 5~~, an asynchronous mobile communication system having an interlocking structure is described. Under the interlocking structure, a UMS

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terrestrial radio access network (UTRAN) 200 may have one or more radio network controller (RNC). The RNC can perform a serving radio network controller (SRNC) function, a controlling radio network controller (CRNC) function or both functions.

Please amend the paragraph [0075] of the specification as indicated:

[0075]   The physical layer transforms the received MAC-PDU a and the MAC-PDU b to a 10 ms radio frame through an encoding unit, a rate matching unit, an interleaver and a modulation unit, then transmits the MAC-PDU a and the MAC-PDU b to a user equipment (UE). At this time, one physical channel is used and the MAC-PDU a and the MAC-PDU b are transformed to the 10 ms radio frame and transmitted to the user equipment by using a physical channel, such as the physical downlink shared channel (PDSCH) ~~PDSCH~~.

Please amend the paragraph [0081] of the specification as indicated:

[0081]   In this specification, for easy description, there is described a transmission process of the RLC-PDU and the HARQ-RLC-Control-PDU generated from the RLC protocol entity, and transmitted to the MAC-D protocol entity of the SRNC through different logical channels. In the RLC-protocol entity operation, a relation indicator is generated to maintain relation between the RLC-PDU and the HARQ-RLC-Control-PDU, and when the RLC-PDU and the HARQ-RLC-Control-PDU are transmitted, the relation indicator may be transmitted along with each PDU. The call process is described in connection with FIG. 10.

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Please amend the paragraph [0083] of the specification as indicated:

[0083]   In here, the MAC-C/SH protocol entity of the CRNC, which receives the RLC-PDU and the HARQ-RLC-Control-PDU from the MAC-D protocol entity of the SRNC, transforms the RLC-PDU and the HARQ-RLC-Control-PDU to the MAC-PDU a and MAC-PDU b, respectively, then schedules the DSCH transport channel to transmit ~~transmits~~ the transformed MAC-PDU a and MAC-PDU b through a transport channel, such as the DSCH. Then the MAC-PDU a and the MAC-PDU b are [[is]] transmitted to the physical layer of the node B through the transport channel, such as the DSCH at step 707.

Please amend the paragraph [0085] of the specification as indicated:

[0085]   After that, the physical layer of the node B which receives the MAC-PDU a and the MAC-PDU b carries out an encoding, a rate matching, an interleaving and a modulation to the MAC-PDU a and the MAC-PDU b, then transforms the MAC-PDU a and the MAC-PDU b to the 10 ms radio frame and transmits it to the receiver through a physical channel, such as PDSCH at step 709. At this time, the physical layer of the node B receives the transport format indicators 1 and 2 (TFI1 and TFI2) , indicating local UMTS air interface transport formats to be used, ~~TFI1 and the TFI2~~ of the MAC-PDU a and the MAC-PDU b from the MAC-C/SH protocol entity with each PDU then transmits the TFI1 and the TFI2 to the receiver through the physical channel, such as the dedicated physical channel (DPCH) [[DPCH]] at step 708.

[Note to the Examiner: The acronym "PDSCH" was defined above in an amendment to paragraph [0075].]

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Please amend the paragraph [0088] of the specification as indicated:

[0088]   The physical layer of the receiver receives the 10 ms radio frame having the MAC-PDU a and the MAC-PDU b transmitted from the receiver through the physical channel, such as the PDSCH at step 802. The physical layer of the receiver receives the <u>TFI1 and the TFI2</u> [[TFCI]], which is essential information to carry out the physical layer operation to the RLC-PDU and the HARQ-RLC-Control-PDU at step 803.

Please amend the paragraph [0089] of the specification as indicated:

[0089]   Next, the physical layer of the receiver <u>uses the TFI2 to extract the MAC-PDU b from</u> ~~transforms~~ the 10 ms radio frame ~~having the TFI2 and the HARQ-RLC-Control-PDU between the TFI1 and the TFI2 received through the physical channel, such as the DPCH, to MAC-PDU~~ through the demodulation, the deinterleaving and the decoding process~~, then transmits the MAC-PDU to the MAC-C/SH protocol entity by using a transport channel, such as the DSCH at step 804~~. At this time, the <u>TFI1 and the</u> 10 ms radio frame having ~~the received TFI1 and~~ the RLC-PDU <u>are</u> [[is]] stored to the buffer. After that, a data identifier is generated to identify the RLC-PDU stored in the buffer<u>,</u> and ~~transmits~~ the data identifier <u>and</u> [[with]] the ~~transformed~~ MAC-PDU <u>b are transmitted</u> to the MAC-C/SH protocol entity <u>using a transport channel, such as the DSCH, at step 804</u>.

Please amend the paragraph [0090] of the specification as indicated:

[0090]   The MAC-C/SH protocol entity receives the <u>data identifier and the</u> MAC-PDU <u>b</u> having the HARQ-RLC-Control-PDU, ~~and the data identifier~~ and transforms the MAC-PDU <u>b</u> to

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the HARQ-RLC-Control-PDU, and then transmits the HARQ-RLC-Control-PDU and the data

identifier to the MAC-D protocol entity at step 805.

Please amend the paragraph [0096] of the specification as indicated:

[0096]   The MAC-D protocol entity transmits the received RLC-PDU to the RLC

protocol entity through the logical channel such as the DTCH at step 811. At this time, in case

of using the same type of logical channel, the RLC-PDU is transmitted to the RLC protocol

entity through the logical channel, such as the DTCH, which is the same channel as [[with]] the

HARQ-RLC-Control-PDU. In case of using a [[the]] different type of logical channel, the RLC-

PDU is transmitted to the RLC protocol entity through the logical channel, such as the DTCH,

which is a different channel from that of the DCCH used to transport the HARQ-RLC-Control-

PDU which is a different channel from the HARQ-RLC-Control-PDU.

Please amend the paragraph [0099] of the specification as indicated:

[0099]   First, SRNC-RLC, which receives data from the upper layer, transforms the

received data to the RLC-PDU and transmits the RLC-PDU to RNC-MAC-D protocol entity

through the logical channel (MAC-D-Data-REQ primitive), such as the DTCH at step 901. Note

that steps 901-904 in FIG. 9 include a reference to a "connectivity indicator." This indicator,

also known as a "relation indicator," is explained in connection with FIG. 10.

Please amend the paragraph [00105] of the specification as indicated:

[00105]   Meanwhile, the CRNC-MAC-C/SH protocol entity carries out DSCH

transmission scheduling to transmit the RLC-PDU and the HARQ-RLC-Control-PDU by the

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transport channel, such as the DSCH, and allocates TFI1 ~~TFL1~~ and TFI2 to the RLC-PDU and

the HARQ-RLC-Control-PDU, respectively, then transforms the RLC-PDU and the HARQ-

RLC-Control-PDU to the MAC-PDU at step 905. At this time, the MAC-PDUs to which ~~MAC-~~

~~PDU which transforms~~ the RLC-PDU and the HARQ-RLC-Control-PDU are transformed are the

MAC-PDU a and the MAC-PDU b, respectively.

Please amend the paragraph [00119] of the specification as indicated:

[0119]   FIG. 10 is a flow chart showing a data transmission method in case of using a

relation indicator (also referred to as, including in FIG. 10, a "connectivity indicator") in

accordance with the present invention.

Please amend the paragraph [00132] of the specification as indicated:

[0132]   Then, the UE-L1 of the receiver receives the 10 ms radio frame, which has the

RLC-PDU and the HARQ-RLC-Control-PDU, from node B-L1 through the physical channel,

such as the PDSCH and receives the TFI1 and the TFI2 through the physical channel, such as the

DPCH, and then[[,]] uses ~~transforms~~ the TFI2 to extract the MAC PDU b, which has the HARQ-

RLC-Control-PDU, from [[and]] the 10 ms radio frame~~, which has the HARQ RLC-Control-~~

~~PDU,~~ after carrying out the demodulation, the deinterleaving and the decoding process. After

that, the UE-L1 transmits the MAC-PDU b ~~MAC-PDU~~ and the data identifier to the UE-MAC-

C/SH protocol entity through the transport channel (PHY-Data-IND primitive), such as the

DSCH at step 110.

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Please delete paragraphs [00141]–[00146] inclusive of the specification as indicated:

[0141] ~~The effectiveness of the present invention is as below.~~

[0142] ~~First, the present invention can regulate each of coding rate by constructing essential information between the data, e.g., a sequence number and a version number, etc. to the different PDU, such as the RLC PDU and the HARQ RLC Control PDU.~~

[0143] ~~Second, the present invention can decrease an error-generating rate of the PDU that has essential information of the data by constructing essential information between the data, e.g., a sequence number and a version number, etc. to a different PDU.~~

[0144] ~~Third, the present invention can carry out a data combining which is performed in the physical layer in case of realizing the hybrid ARQ type II/III, because it firstly checks the HARQ RLC Control PDU between the RLC PDU and the HARQ RLC Control PDU.~~

[0145] ~~Fourth, the present invention can use radio resource efficiently because it uses a transport channel such as DSCH and can reduce a time delay followed by a resource allocating operation.~~

[0146] ~~Fifth, the present invention can reduce a time delay problem between Iur and Iub because it uses one transport channel.~~

Please amend the abstract (paragraph [00148]) as indicated:

[00148] ~~A data processing method for a hybrid ARQ type II/III on a downlink of a wide-band radio communication system, wherein SRNC which is directly connected to a user equipment to allocate wireless resources to the user equipment and provides services by interlocking with a wireless communication core network in case of a call connection and CRNC which controls a sharing channel of a radio network are located on the different radio network~~

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includes the steps of: a) generating a RLC-PDU in a RLC layer of the SRNC and generating a part having RLC-PDU information needed for supporting the hybrid ARQ type II/III based on a header of the RLC-PDU (hereinafter, referred to as a HARQ-RLC-Control-PDU); b) transmitting the RLC-PDU and the HARQ-RLC-Control-PDU to MAC-D treating a general user part of a MAC layer through a logical channel; c) transmitting the RLC-PDU and the HARQ-RLC-Control-PDU of the MAC-D of the SRNC to MAC-C/SH treating common/shared channel part on the MAC layer of the CRNC; d) transforming the RLC-PDU and the HARQ-RLC-Control-PDU of the MAC-C/SH of the CRNC to a transmission block and transmitting it to a physical layer of a base station through a transport channel; and e) processing the transmission block to a radio-transmission form in the physical layer of the base station and transmitting it to the base station through the physical layer.

[00148]   A data processing method for a hybrid ARQ type II/III on a downlink of a wide-band radio communication system, wherein a SRNC and a CRNC are located on different radio networks, comprising: a) generating an RLC-PDU in an RLC layer of the SRNC and generating a PDU based on a header of the RLC-PDU (HARQ-RLC-Control-PDU); b) transmitting the RLC-PDU and the HARQ-RLC-Control-PDU via a logical channel to a MAC-D of the SRNC via a logical channel; c) transmitting the RLC-PDU and the HARQ-RLC-Control-PDU from the MAC-D of the SRNC to a MAC-C/SH of the CRNC; d) transforming the RLC-PDU and the HARQ-RLC-Control-PDU to a transmission block and transmitting it to a physical layer of a base station through a transport channel; and e) processing the transmission block to a radio frame in the physical layer of the base station and transmitting the frame to a mobile station through a physical channel.